

REMARKS

In the Office Action, the Examiner rejected the claims under 35 USC §103. These objections and rejections are fully traversed below. Applicant has amended the claims to further clarify the subject matter regarded as the invention. In addition, claims 3, 24, 51, 57, and 62 have been cancelled. Claims 1-2, 4-23, 25-50, 52-56, 58-61, and 63-66 remain pending.

Reconsideration of the application is respectfully requested based on the following remarks.

REJECTION OF CLAIMS UNDER 35 USC §102 AND 35 USC §103

In the Office Action, the Examiner rejected claims 1-10, 12-14, 16-20, 22-31, 33-35, 37-42, and 44-66 under 35 USC §103(a) as being unpatentable over Clear et al, US 2002/0101868 A1, ('Clear' hereinafter) in view of Behzadi, US Patent No. 6,728,220 B2, ('Behzadi') hereinafter). The Examiner further rejected the claims 11 and 32 under 35 USC §103 further in view of Wakayama, U.S. Publication No. 2002/0101868 A1, ('Wakayama' hereinafter, rejected claims 15 and 36 under 35 USC §103 further in view of Walrand et al, U.S. Patent No. 6,674,760 B1, ('Walrand' hereinafter) and rejected claims 21 and 43 under 35 USC §103 further in view of Aggarwal et al, US 2002/0101868 A1, ('Aggarwal' hereinafter). These rejections are fully traversed below.

With respect to independent claim 1, as amended, the claim recites "encapsulating the packet or frame with a virtual storage area network identifier and information specifying at least one of a TTL value and MPLS information, wherein encapsulating comprises appending a header to the packet or frame to create a new packet or frame, wherein the header includes fields for the virtual storage area network identifier and information specifying at least one of the TTL value and the MPLS information." It is important to note that this method is performed in a storage area network.

It is important to note that the primary reference cited by the Examiner, Clear, relates to a VLAN, not a VSAN. Thus, the tunneling protocol disclosed in Clear relates to a VLAN identifier rather than a VSAN identifier. More particularly, as set forth in paragraph [0048], the appropriate MPLS and VLAN classification information are attached to the packet at 132.

The Examiner asserts in the recent Office Action that a SAN is well known in the art, citing Tamura et al (U.S. Patent No. 6,728,848). The Examiner further cites Ishizaki (US 2003/0101239 A1), stating that this reference also teaches storage devices using a Virtual Local Area Network. However, the Examiner further asserts that “the VLAN in Clear et al is used as a “Storage Area network” SAN in recited in the claims.” Applicant respectfully traverses this assertion. Even though SANs are, in fact, well-known in the art, the references fail to disclose or suggest the claimed invention for use in a VSAN.

It is also important to note that a SAN denotes a physical infrastructure. In contrast, the invention of claim 1 relates to VSANs. As set forth in the Summary of the Invention on page 4 of Applicant’s specification, “[t]hrough the concept of a VSAN, one or more network devices (e.g., servers) and one or more data storage devices are grouped into a logical network defined within a common physical infrastructure.”

As set forth in the Background section of Applicant’s specification, encapsulation mechanisms for transporting packets between ports of switches in a network on the basis of VLAN associations among those ports are in existence. One such encapsulation mechanism is ISL, developed by Cisco Systems. However, ISL does not support multiple different protocols on a single physical network infrastructure. Thus, current technology fails to address the need for supporting a multiple SAN system in which different protocols or technologies simultaneously co-exist. It is important to note that operating multiple different protocols is desirable in a SAN in order to support different storage devices operating under different protocols. This problem would not be immediately obvious in a VLAN environment in which a single protocol is typically used. Moreover, ISL was not optimized for Fibre Channel transmissions, and therefore could not easily be implemented in modern SANs.

The claimed invention enables different protocols to co-exist in a VSAN system. For instance, the type of MPLS information that may be specified in the header is recited in claims 17-20. From these claims, it can be seen that the presence and number of MPLS

labels provided in the MPLS information can be indicated in the MPLS information/packet header. Thus, the MPLS information may vary, as necessary, with the protocol/type of traffic. As another example, claims 8-10 enable the type of traffic to be specified. This information was previously not necessary, since multiple protocols could not be supported on a single physical network infrastructure. Neither of the cited references discloses supporting multiple protocols or types of traffic in this manner.

Neither of the references discloses or suggests supporting multiple different protocols on a single physical network infrastructure. While operating multiple different protocols is desirable in a SAN in order to support different storage devices operating under different protocols, this is not pertinent to the VLAN environment. Thus, there was no need to specify various information in the packet, such as type of traffic or indicate whether MPLS labels are present (and if so, how many). As such, neither of the references discloses the problem present in the current technology pertinent to the SAN environment, nor do they suggest a solution to this problem. Moreover, since a single protocol/type of traffic is typically used in a VLAN environment, Clear teaches away from supporting multiple different protocols in a network such as a SAN or VSAN.

The Examiner further cites Behzadi, which discloses the use of a TTL field in combination with an MPLS label within a Shim header, as shown in FIG. 5. However, it is important to note that Behzadi relates to preventing transmission loops in a label switching domain. See Title. More particularly, the invention disclosed in Behzadi relates solely to preventing transmission loops in a ring network that utilizes label switching. See Abstract. Behzadi fails to disclose or suggest preventing transmission loops in a network that is not a ring network. As such, Behzadi teaches away from preventing transmission loops in a network that is not a ring network using a TTL field.

It is important to note that the claimed invention relates to a SAN rather than a ring network. Neither of the cited references discloses or suggests the routing problems that can occur within a SAN. More particularly, in some SANs, there may be topology as well as routing problems that could cause a frame to traverse a loop within the network. As such, the references, separately or in combination, fail to disclose the use of the TTL field in a SAN environment in the manner claimed.

Independent claim 65, as amended, recites, in part:

encapsulating said fibre channel packet or frame with a TTL value, wherein encapsulating comprises adding a header to the packet or frame to create a new packet or frame, wherein the header includes a field for the TTL value; and

sending the encapsulated packet or frame over an inter-switch link in the fibre channel network.”

The cited references, separately or in combination, fail to disclose or suggest encapsulating a packet or frame in a fibre channel network with a TTL value. In fact, as set forth above, Behzadi teaches away from preventing transmission loops in a network that is not a ring network, such as a fibre channel network. Moreover, neither of the cited references relates to a fibre channel network. As such, the combination of the cited references would fail to achieve the desired result. Accordingly, Applicant respectfully submits that claim 65 is patentable over the cited references.

Independent claim 55, as amended, recites in relevant part, “encapsulating the packet or frame with a virtual storage area network identifier and information specifying a type of traffic to be carried by the packet or frame, wherein the available types include at least one of Ethernet, fibre channel, and Infiniband, wherein encapsulating comprises adding a header to the packet or frame to create a new packet or frame, wherein the header includes fields for the virtual storage area network identifier and the information specifying the type of traffic to be carried by the packet or frame.”

It is important to note that the type of traffic refers to the standard protocol employed to generate the frame in question. Through the identification of a traffic type, frames carrying a variety of traffic types may be transmitted within a VSAN. Moreover, multiple VSANs, each capable of supporting different traffic types, may be interconnected through the identification of a traffic type in the newly appended header. The cited references fail to disclose such a need in the prior art, or a solution such as that claimed.

With respect to independent claim 55, as amended, neither of the cited references, separately or in combination, discloses or suggests “encapsulating the packet or frame with a virtual storage area network identifier and information specifying a type of traffic to be carried by the packet or frame, wherein encapsulating comprises adding a header to the packet or frame to create a new packet or frame, wherein the header includes fields for the virtual storage area network identifier and the information specifying the type of traffic to be

carried by the packet or frame.” In fact, neither of the cited references discloses or suggests encapsulating the packet or frame with a VSAN identifier. Clear does disclose identifying the MPLS packet by its Ethertype (Etype) protocol identification. See paragraph [0040]. As shown in FIG. 6A, the MPLS EType 96 is included in the MPLS header. However, as set forth in paragraph [0044], the protocol type 96 identifies that the MPLS protocol is used for transmitting the packet. Thus, the MPLS Etype is used to identify the MPLS protocol, not a type of traffic “wherein the available types include at least one of Ethernet, fibre channel, and Infiniband,” as claimed. Thus, the combination of the cited references would fail to achieve the desired result. The cited references, separately or in combination, fail to disclose or suggest identifying the type of traffic within a VSAN. In fact, as set forth above, Clear relates to a VLAN, in which a single type of traffic is typically used, and therefore teaches away from enabling multiple types of traffic to be transmitted. As a result, it would be unnecessary to specify the type of traffic within a header. Accordingly, Applicant respectfully submits that claim 55 is patentable over the cited references.


The additional references Wakayama, Walrand, and Aggarwal fail to cure the deficiencies of the primary reference. Based on the foregoing, it is submitted that the independent claims are patentable over the cited references. In addition, it is submitted that the dependent claims are also patentable for at least the same reasons. The additional limitations recited in the independent claims or the dependent claims are not further-discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from the cited references. Thus, it is respectfully requested that the Examiner withdraw the rejection of the claims under 35 USC §103.

SUMMARY

An early Notice of Allowance is earnestly solicited. If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for an extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388 (Order No. ANDIP001).

Respectfully submitted,
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